

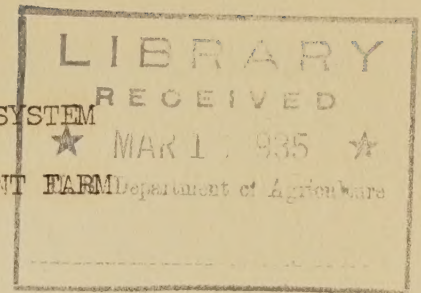
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SPECIFICATIONS FOR ADDITIONAL SEWERAGE SYSTEM  
TO BE CONSTRUCTED ON THE  
U. S. DEPARTMENT OF AGRICULTURE EXPERIMENT FARM  
BELTSVILLE, MARYLAND.



OFFICE OF THE SECRETARY - F.P.-17

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February 23, 1935.

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GENERAL CONDITIONSGeneral Intention

These specifications and the accompanying drawings are intended to provide for the furnishing of all labor, materials, transportation, tools and equipment required for the construction of an additional Sewerage System (F.P.-17), consisting of 8-inch and smaller vitrified tile pipe sewers, manholes and covers, automatic pumping station complete, cast iron piping and specials as required, and all excavation for same.

The Contractor shall connect sewers to buildings, outside of building lines, and provide such branch sewers as are shown or as may be directed by the Engineer for structures existing, projected, or probable future projects. All parts shall be complete in every respect and the Contractor shall do all work necessary for proper completion as shown, specified, or directed.

Location

The work shall be located on the U. S. Department of Agriculture Experiment Farm, Beltsville, Maryland, as indicated on the drawings accompanying the specifications.

Information respecting the site and the extent of the work given on the drawings and in the specifications has been obtained by Government representatives and is believed to be reasonably correct, but the Government does not warrant either its completeness or accuracy. Bidders are advised to visit the site and fully inform themselves as to the location of the work, the fact that many of the sewers are in wooded areas, the ground water and soil conditions, and all of the conditions under which the work is to be done.

Drawings Accompanying Specifications

The following drawings accompany these specifications and will form a part of the contract. Wherever "as shown", "as indicated", "as detailed", or words of similar import are used, it shall be understood that reference to these drawings is made unless otherwise stated. Drawings are the property of the Government and shall not be used for any purpose other than that contemplated by the specifications. Serial No. 2981 applies to all of the following drawings:

Location Plan	Sheet 1 of 5
Sewer Plans and Profiles	" 2 " 5
Sewer Plans and Profiles	" 3 " 5
Sewer Plans and Profiles	" 4 " 5
Pumping Station	" 5 " 5

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national security

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### Specifications and Drawings

Discrepancies, errors, or omissions, noted by intending bidders in the specifications and on the drawings should be reported promptly to the Chief of the Division of Purchase, Sales and Traffic, U. S. Department of Agriculture, for correction or interpretation before the date of opening of the bids.

Large scale drawings shall, in general, govern over small scale drawings, and figures marked on drawings shall, in general, be followed in preference to scale measurements, but the successful bidder, before laying out the work, shall compare all drawings and verify the figures, and will be held responsible for any work improperly executed.

### Proposal

The form of proposal furnished, herewith, shall be used in making out the bid. The prices must be written in the proposal in words and also stated in figures, and any proposal not in accordance with these instructions or not on the blanks furnished, may be rejected. Any bids not covering the complete bid items as specified may be rejected. Bids upon alternates not specified or asked for will not be considered. No proposal of any bidder will be accepted unless he is known to be skilled in work of a nature similar to that covered by the contract. Satisfactory evidence of ability and qualifications shall be furnished. While separate prices are required for the various items, the contract will be awarded as a whole. No proposal containing unbalanced bids will be accepted. No permission will be given for the withdrawal of any bid.

### Quantities Approximate

In entering into this contract, the Contractor agrees that the quantities of work as stated in the Schedule of Prices, or indicated on the plans, are only approximate, and that during the progress of the work the Government may find it advisable, and it shall have the right, to omit portions of the work, and to increase or decrease the quantities, and that the Government reserves the right to add to or to take from the total amount of the work up to a limit of twenty<sup>five</sup> (25) per cent of the total amount of the contract based upon the said estimated quantities. The Contractor shall and will at no time make claim for anticipated profit or loss of profit, because of any difference between the quantities of the various classes of work actually done, or of the material actually furnished and the said estimated quantities.

### Definition of Terms

In these specifications and in related forms, the intent and meaning of the following terms shall be interpreted as follows:

Secretary - The Secretary of the United States Department of Agriculture.

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Contracting Officer - The officer who signs the contract upon behalf of the Government, and shall include his duly appointed successor or his authorized representative.

Chief of Bureau - The Chief of the Bureau of Agricultural Engineering, Department of Agriculture, who is hereby designated an authorized representative of the Contracting Officer.

Engineer - An authorized representative of the Government, assigned to supervise the work under this specification and to make any or all necessary inspections of materials furnished and work performed by the contractor.

#### Bid Guarantee

Guaranty will be required with each bid to insure the execution of the contract and no bid will be considered unless it is so guaranteed. The bidder at his option may furnish a guaranty bond, a certified check, or United States Bonds in amount of One Thousand Five Hundred Dollars (\$1,500).

#### Performance Bond

The successful bidder shall execute a formal contract on Form PWA-51 (sample enclosed) and shall furnish a satisfactory bond, in amount not less than 100 per cent of the total cost of the work based upon the estimated quantities given and the unit prices bid in the Schedule of Prices, executed upon Standard Form No. 25 in use by the Government, insuring the fulfillment of all provisions of the contract and the prompt payment of persons furnishing labor and materials in the prosecution of the work.

#### Time for Completion

The work shall be completed within 180 calendar days after date of receipt of notice to proceed therewith.

#### Liquidated Damages

Damages for delay in the completion of the contract, in accordance with Article 9 of the United States Government Form of Contract, No. PWA-51 (Federal Emergency Administration of Public Works Project), shall be at the rate of \$20.00 per calendar day.

#### Patents

The Contractor shall hold and save the Government, its officers, agents, servants, and employees, harmless from liability of any nature or kind, including costs and expenses, for or on account of any patented or unpatented invention, article or appliance manufactured or used in the performance of this contract, unless otherwise specifically stipulated in this contract.





Proprietary Articles

Trade names mentioned herein are used for descriptive purposes only, as indicative of the class of material desired. Bidders may base their proposals upon similar articles if they are equal in appearance and quality and meet the specifications in all respects.

Guaranties

All mechanical work under this contract shall be guaranteed for one year from the date of final settlement under this contract, except when a different period is specifically prescribed. Wherever work, repairs, or changes are required under any guaranty, required by this contract, this Contractor whenever notified by the Bureau, whose decision in all cases shall be final, must immediately (1) place in satisfactory condition in every particular any of such guaranteed work, and (2) make good all damage to the building or grounds, or the equipment or contents thereof, if such unsatisfactory condition or damage develops within the period stipulated by the guaranty and is due to the use of materials or workmanship which is inferior, defective, or not in accordance with this contract, and must make good any work or materials, or the equipment and contents of said building or grounds, which is disturbed in fulfilling any such guaranty. In any case where, in fulfilling the requirements of this contract or of any guaranty, embraced in or required thereby, this Contractor disturbs any work guaranteed under another contract, he must restore such disturbed work to a condition satisfactory to the Bureau and guarantee such restored work to the same extent as it was guaranteed under such other contracts. Upon the Contractor's failure so to proceed promptly to comply with the terms of any guaranty under this contract or still running upon work originally executed by other contractors, the United States, acting through its duly authorized representatives, may (1) either have such work performed as the Bureau deems necessary to fulfill such guaranties, or (2) allow such damaged or defective work or portion of the building or grounds or contents or equipment of the building, or work disturbed in fulfilling guaranties, or guaranteed work, which shows such a condition as to make any such guaranty operative, to remain in such unsatisfactory condition; PROVIDED that in either event the Contractor shall promptly pay the United States such sums as were (in the first instance) expended so as to fulfill such guaranty, or as it would have been (in the second instance) necessary to expend to fulfill such guaranty. Usual wear and tear and the results of accidents not chargeable to the Contractor or his agents are excepted from the requirements of this paragraph. Everything done in the fulfillment of any guaranty must be without additional expense to the United States.





### Federal Specifications

The Federal Specifications referred to herein shall form a part of these specifications. Materials so specified shall conform to the technical requirements of the respective Federal Specifications referred to or the latest edition thereof. Federal Specifications are not furnished to bidders or contractors, as they were prepared in collaboration with manufacturers and producers who are assumed to be familiar with their requirements. Copies of Federal Specifications which bidders or contractors may require can be purchased from the superintendent of Documents, Government Printing Office, Washington, D. C.

The Contractor should exercise especial care to refer, in request for quotations, in orders, and in subcontracts, to these Federal Specifications.

### Shop or Working Drawings

The Contractor shall submit copies, in triplicate, of shop details, bending diagrams for reinforcing steel, electric conduit layouts, cast iron piping layouts, etc., to the Chief of the Bureau (or his designated representative) and his approval obtained before proceeding with the work for which such drawings are required hereinafter. When approved, one set of the prints will be returned to the Contractor so marked. When changes or corrections are necessary, one set will be returned to the contractor so noted and he shall proceed as before with the submission of revised prints.

Shop drawings shall be numbered and shall be accompanied by a letter of transmittal giving a list of the numbers. Each drawing shall be marked with the name of the project and name of the Contractor. If the shop drawings show variations from the contract requirements because of standard shop practice or other reason, the Contractor shall make specific mention of such variations in his letter of submission.

The approval of shop drawings will be general and will not relieve the Contractor from the responsibility for proper fitting and construction of the work nor from furnishing materials and work required by the contract which may not be indicated on the shop drawings when approved.

### Samples

The Contractor shall submit for approval, to the Bureau or to the Engineer on the work, samples of all such materials as may be required whether mentioned specifically herein or not. The approval of samples, or the approval of materials or finished articles at the place of production, manufacture, shipment, or delivery, shall not preclude rejection at any time prior to the acceptance of the completed work, for noncompliance with contract requirements.





All samples shall be labeled properly for identification and shall be accompanied by a letter from the Contractor containing a list of the samples, name of the building or work on which the material is to be used, name of the manufacturer, and brand name of the material. Transportation charges on samples shall be prepaid.

Samples shall be submitted in time for proper consideration and action by the Bureau before materials which the samples represent are delivered at the work.

In the case of materials subject to laboratory tests, the Contractor may submit, in lieu of samples, the name of the manufacturers and the brands of the materials proposed. Those that have been tested frequently and found to meet the requirements of the specifications will be approved conditionally. In such cases, the Engineer may take samples of the materials when delivered on the work and have them tested. If they fail to meet the specification requirements, their conditional approval will be withdrawn.

Approval samples of materials not subject to destructive tests will be sent direct from the Bureau to the Engineer at the work and kept on file until completion of the contract, except approved samples of hardware in good condition which may be marked for identification and used in the work.

Samples that are not approved will be returned to the Contractor only upon request and at his expense. If the return of such samples is not requested before completion of the contract, they will be disposed of as unclaimed material.

#### Lines and Grades

All of the work under this contract shall be built in accordance with the lines and grades shown upon the drawings and as given by the Engineer, or in cases where lines and grades are not shown on the drawings they shall be as given by the Engineer. The Engineer may also modify the lines and grades shown on the drawings if it is found necessary or desirable to do so. The Contractor will be required to furnish such materials and render such assistance as may be required for setting and preserving line and grade boards and stakes. The Engineer will set grade stakes at angle points and at 100 foot intervals, and the Contractor shall set batter boards at 25 foot intervals. The Contractor shall use an engineer's level and not a carpenter's level, to transfer from grade stakes to batter boards. The Contractor shall give at least twenty-four (24) hours' notice in advance of his need of grades, lines, etc., other than the usual extent. The Contractor shall carefully preserve all lines, grades, etc., as staked until he is authorized to remove them.





Underground Information, Connections, Etc.

Should the Contractor encounter quicksand, water, old masonry, sewers, pipes, conduits or other underground objects or structures not shown on the drawings, he shall have no claim for any additional compensation on this account, it being clearly understood and agreed that the Government does not by implication or otherwise guarantee that such objects will not be encountered in the execution of this Contract.

Existing tile drains or other pipes which may appear within the limits of the excavations shall be removed if required by the Engineer or shall be protected or replaced as found, but such removal, protection or replacement will not be paid for separately, being included in the price paid for excavation or other items. Damaged pipes or structures shall be satisfactorily replaced at the Contractor's expense.

The breaking into or connection to existing sewers shall not entail additional compensation other than that included in the unit prices bid for pipe and fittings or excavation.

In case the uncovering of sub-surface structures necessitates a change in the alignment or grade of the proposed work, the Contractor shall notify the Engineer of such obstruction and shall cease work at such points until ordered to proceed.

In case any change of grade or alignment shall serve to delay the work, the time allowed for completion of the contract will be extended to the extent to which the delay shall have operated.

Water and Power for Construction Purposes

Water for construction purposes will be furnished to the Contractor without charge, but transportation of water from existing sources shall be by the Contractor at his own expense. Any electric power required by the Contractor for construction purposes shall be obtained by him entirely at his own expense.

Contractor's Responsibility for Work

Until the final acceptance of the work, as evidenced in writing, the Contractor shall have charge and care thereof and shall take every necessary precaution against injury or damage to any part of the work by action of the elements or from any other cause. The Contractor shall make good all injuries or damages occurring to any portion of the work before its completion and acceptance and shall bear the expense thereof.

The Contractor's responsibility will terminate when all work has been completed, the final inspection made, the work accepted by the Chief of the Bureau, and the final payment made. The Contractor will then be released from further obligation except upon proof of error or as required in the contract and as set forth in the performance bond.



### Subcontractors

The Contractor will be free to select subcontractors for the work, but in all cases, the subcontractors shall be capable of performing in a satisfactory manner all work included in their particular branch.

If required by the Chief of the Bureau, in connection with any special branches of the work, the Contractor shall submit to the Bureau for approval, the names and addresses of the firms which he proposes to employ as subcontractors, with an explanation of their qualifications and experience.

The Contractor will be responsible for all acts of the subcontractors employed by him, and the approval of the Chief of the Bureau of any subcontractor will not relieve the Contractor of such responsibility. The failure of any subcontractor to complete his branch of the work in a satisfactory manner within the proper time will not excuse the Contractor for any delay in the completion of the entire contract.

### Protection of Public and Property

The Contractor shall protect all materials and work against injury from any cause and shall provide and maintain all necessary guards, lights, etc., for the protection of persons and property. Roadways shall be kept open so that traffic can pass.

### Temporary Heat

The Contractor shall provide temporary heat to protect all work and materials against injury from dampness and cold. At all times when there is concrete not thoroughly set, he shall maintain a temperature of not less than 40 degrees Fahrenheit at the places where those conditions exist.

### Temporary Toilet Facilities

The Contractor shall provide for the use of his workmen, where directed, ample sanitary toilet accommodations. He shall keep such places in a clean, sanitary condition and prior to the completion of the contract shall remove same and leave the premises clean.

### Removal of Debris, Cleaning, Etc.

Upon completion of the work, the Contractor shall remove all temporary buildings and all his plant, tools, materials, debris or other articles from the property of the Government. He shall also sweep the pumping station floors broom-clean, clean the window lights, remove all dirt and debris from the site, and leave the premises in a neat and clean condition. The interior of the sewers shall be carefully freed from all dirt and superfluous material of every description, as the work progresses, and left clean at the completion of the contract.





Final Inspection

A final inspection will be made after all work under the contract is completed. The Contractor shall notify the Chief of the Bureau in writing that the work will be ready for final inspection on a definite date which will be stated in the letter. The notice shall be given 5 to 7 days prior to the date chosen.





## EXCAVATION

Item 1Extent of Work

1.1 Under Item 1, the Contractor shall do all excavation work necessary to complete the work as shown, specified, or required by the Engineer for any purpose appurtenant to the construction. Work under this item shall include removal of trees, brush or other surface material, and the excavating, sheeting and bracing, pumping and drainage, back-filling, cleaning up, supporting of any existing structures which might be disturbed by the work, care and protection of the work, safety precautions and other miscellaneous general work incidental to excavation and not specified and paid for under specific items.

Kind of Excavation

1.2 Bids shall be based on the assumption that no rock will be encountered. "Rock" shall be defined as solid ledge rock requiring blasting for economical removal, or boulders more than one-half cubic yard in volume. In case rock should be encountered, an adjustment in the contract price and (or) the time for completion will be made as provided in Article 4 of the contract.

Clearing and Care of Surface Materials

1.3 The sites of all excavations shall be cleared of all trees, stumps, brush, rubbish or other surface material. All such material shall be removed and disposed of in a satisfactory manner. It is an intent of these specifications to prevent the unnecessary destruction of trees. The Contractor will not be required to remove any trees except those within one foot of the pipe or so close to the excavation that they might settle into it or onto the pipe. Large roots near trees left standing shall not be cut or injured unless actually within limits of the pipe or structure. The Contractor may, however, remove such trees as it is reasonably necessary for him to remove to permit his passage, at a distance of not to exceed five feet from the excavation payment lines. Where trees are removed, the stumps shall be removed also, and if blasting is required the removal shall be before the pipe is laid.

Fences removed to facilitate sewer construction shall not be cut except at corner posts. They shall be handled carefully, and properly replaced as soon as possible.

The Contractor shall leave the roads, walkways and all other places disturbed or affected by the work in as near as practicable the same condition as they were before being disturbed. Grass and shrubs in areas where they are cultivated or in lawns, as in the Zoology or Insecticide areas, shall be protected and replaced where damaged.



### Trenching and Trimming

1.4 All trenches and excavations shall be of sufficient dimensions to permit sewers or other structures to be properly placed in the manner and of the size shown, specified or required, with width for proper bracing when bracing is desirable, and to permit removal of any material which the Engineer may deem unsuitable for foundation.

In no case shall the earth be plowed, scraped or dug by machinery nearer than six (6) inches to the finished earth foundation; the last six inches shall be removed with pick and shovel just before placing the masonry or pipe therein.

The bottoms of trenches shall be dug out under each hub to give a solid bearing for the body of the pipe, and so that the proper joint can be made.

Roadways or walks intersected shall at all times be kept open by suitable bridging or by tunneling.

### Unsuitable Foundation Materials

1.5 Where unsuitable foundation materials are encountered at the depths of excavation shown on the drawings or ordered by the Engineer, the Contractor shall, upon instruction of the Engineer, excavate further and refill the excavated space with such material as the Engineer may direct. If the refill material required is a suitable well tamped earth, no additional payment will be made except for the excavation at the unit price bid under Item 1. If the refill material required by the Engineer is concrete, payment will be made under the appropriate item. Gravel or sand refill will be paid for as provided under Article 4 of the contract.

### Unauthorized Excavation

1.6 Whenever excavation is carried beyond the lines and grades given by the Engineer, the Contractor shall, at his own expense, refill all such excavated space with such material and in such manner as the Engineer may direct. Beneath and around concrete structures, space excavated without authority shall be thoroughly compacted when refilling, or if deemed necessary by the Engineer, shall be filled with concrete at the Contractor's expense.

### Removal of Water

1.7 The Contractor shall at all times during the construction of the work, provide and maintain ample means and equipment with which to promptly remove and properly dispose of all water or sewage entering the excavations or other parts of the work, and shall keep such excavations dry until the structures to be built therein are com-





pleted. No masonry or pipe shall be laid in water, and water shall not be allowed to rise over masonry until concrete or mortar has set at least 24 hours. All water pumped or drained from the work shall be disposed of in a satisfactory manner without damage to adjacent property or to other work under construction. Necessary precautions shall be taken to provide against flooding. It is the intent of these specifications to secure dry and watertight work, and all means to this end will be required of the Contractor.

### Sheeting and Bracing

1.8 The Contractor shall furnish, put in place and maintain such sheeting, braces, rangers, and other timbering, as directed by the Engineer, or as may be required to support the sides of the excavations and to prevent any movement which could in any way injure or delay the work, diminish the necessary width of the excavation, or endanger adjacent structures.

Care shall be taken to prevent voids outside of sheeting, but if voids are formed they shall be immediately filled and rammed satisfactorily.

For the purpose of preventing injury to piping or other structures, to other property or to persons, the Contractor may leave in place to be embedded in the backfill, any sheeting or bracing which he considers necessary for the purpose. The Engineer may direct that such sheeting be cut off at any elevation, and in no case without permission shall timber be left in the ground above an elevation eighteen (18) inches below the surface.

All timber not left in place shall be removed in such manner as not to endanger the new work or any adjacent structures. All voids left by withdrawal of sheeting shall be refilled immediately with sand or fine earth, properly rammed or puddled into place.

In any case where sheeting or bracing is not used or is removed, the Contractor shall assume full responsibility for injury to the pipe or other structure, or to property or persons, arising from failure to use or to leave in place a sufficient amount of sheeting or bracing.

No payment will be made for timber left in place other than that included in the unit price bid per cubic yard of excavation.

### Backfilling

1.9 The Contractor shall proceed expeditiously with the backfilling and cleaning up so that the length of trench open may be as short as possible. In backfilling trenches care shall be taken not to disturb the pipe grade or alignment. Unfrozen earth, sand or gravel, free from vegetable matter or refuse, shall first be compacted firmly





and evenly beneath and on both sides of the pipe in six inch layers and to a depth of one foot over the top of the pipe. For that part of the backfill at least one man shall use a light tamper for each man shoveling backfilling material into the trench. All other backfill, including that around other structures, shall be placed in horizontal layers not over one foot in depth and each layer tamped or puddled thoroughly so that subsequent settlement will be a minimum. Backfilling around structures shall not be done until enough time has elapsed so that no damage can result. Surfaces shall be left smooth and even, neatly mounded over the excavation.

#### Measurement and Payment

1.10 Excavation for masonry structures will be measured from the surface of the ground to the profile of the under side of the structure, and between vertical planes passing through points twelve (12) inches outside the limiting lines of the structure. Excavation for pipes will be measured from the surface of the ground to a horizontal plane passing through the outside of the bottom of the barrel of the pipe, and between vertical planes two (2) feet farther apart than the inside diameter of the pipe, with no additional allowance for bell holes.

The price bid per cubic yard for "Excavation" shall include clearing, excavation, backfilling, hauling, disposal of excess material, grading around pump station, sheeting and shoring, removal of all water, cleaning up, and everything appurtenant to excavation that is not included specifically under other items.



## CONCRETE

Item 2Extent of Work

2.1 Under Item 2 the Contractor shall furnish all materials and shall construct concrete for manhole floors including the shaped inverts, the automatic pumping station substructure, the piers for creek crossings, and any other concrete that may be required for pipe encasement under roadways or elsewhere.

Cement

2.2 All cement used in the work shall be an approved standard brand of portland cement complying with Federal Specification No. SS-C-191.

Water

2.3 All water used for mixing and curing concrete shall be clean, fresh, and free from oil, acid, alkali, salt, and organic matter.

Fine Aggregate

2.4 Fine aggregate for concrete shall consist of natural sand or stone screenings, or a combination of both, having hard, strong, durable particles free from clay, loam, salt, alkali, and other deleterious substances. The fine aggregate shall be well graded and shall comply with all requirements of Federal Specification No. SS-A-281 for Class 1, Grade A aggregate.

Course Aggregate

2.5 Coarse aggregate shall consist of broken stone or natural gravel having hard, strong, durable pieces free from clay, loam, salt, alkali, and other deleterious matter. The coarse aggregate shall be in accordance with Federal Specification No. SS-A-281 for Class 2, Grade A aggregate, and shall be well graded within the limits given therein for No. 4 to 1-inch aggregates.

Hydrated Lime

2.6 Hydrated lime shall be of an approved brand complying with Federal Specification No. SS-L-351, Type M.

Storage of Materials

2.7 Cement and hydrated lime shall be stored at the site in such a manner that it will not absorb moisture from the ground, and shall be covered so as to be completely protected from the elements.





Coarse and fine aggregates shall be stored in separate piles and especial care shall be used in handling to avoid the inclusion of any clay or other foreign materials in the concrete.

#### Forms

2.8 Forms shall be built true to line, of sound good quality surfaced lumber, and shall be mortar tight and sufficiently rigid to prevent displacement or bulging between supports.

Exposed surfaces and interior surfaces of the forms for the pumping station and for piers shall be coated with a non-staining mineral oil which shall be applied immediately before the reinforcement is placed.

Wall ties, inserts, pipe sleeves, wall castings, manhole steps, etc., required in connection with the pumping station shall be built into the forms.

Before placing concrete, all form work shall be cleaned free of dirt and construction debris. Snow or ice shall be removed and points at which water has gathered shall be drained.

Forms shall be left in place until the concrete is safely self-supporting. Adequate provision shall be made to keep the surfaces of the concrete damp. Concrete shall be protected from damage during wrecking of form work and from injury resulting from storage or movement of materials or equipment during construction.

#### Mixing and Placing of Concrete

2.9 All concrete shall be proportioned by volume. One sack of portland cement (94 pounds net) shall be considered equal to one cubic foot.

Concrete shall be mixed in the proportion of 1 part cement to 2 parts fine aggregate to 4 parts coarse aggregate.

All concrete shall be mixed with as little water as practicable to produce a dense, plastic consistency and provide proper workability. The slump for concrete shall be not less than 3 inches nor more than 6 inches. Twenty-eight days after being poured, the compressive strength of the concrete shall be not less than 2000 pounds per square inch. The Government reserves the right to verify this strength by taking test cylinders from concrete as it is being deposited in the forms.

If the Contractor desires to increase the workability of concrete by using an admixture, he may add hydrated lime to each mix in an amount not greater than 9 pounds to each cubic foot of cement used.





All concrete and cement mortar shall be machine mixed except in an emergency or when hand mixing is permitted by the Engineer. No frozen, caked, or lumpy materials shall be used. All materials, including water, shall be measured accurately for each batch and mixed thoroughly. The minimum time for mixing, after all materials, including water, are in the mixer, shall be 1-1/2 minutes.

Form work shall be completed and all reinforcing shall be wired securely in place before any concrete is poured.

Concrete shall be placed immediately after mixing, in such a manner as will prevent segregation of the aggregates or displacement of reinforcing. It shall be deposited as nearly as practicable in its final position to avoid rehandling. Open troughs or chutes, if used, shall extend as nearly as practicable to the point of deposit. They shall be kept clean and free from coatings of hardened cement and shall be flushed thoroughly with clean water before and after each run. Water used for flushing shall be discharged outside the forms.

Dropping the concrete a distance of more than 5 feet, or depositing a large quantity at any point and running or working it along the forms will not be permitted.

As far as practicable, concrete shall be placed in each section of the work in a continuous operation so as to avoid construction joints. It shall be deposited in horizontal layers and spaded or puddled with approved tools to give a smooth, dense surface free from pockets or honey-combing. The concrete shall be worked carefully around all reinforcement. However, care shall be used to avoid overworking, which may result in segregation. In high wall sections, batches of mortar containing the same proportion of cement to sand used in the concrete, and of a mushy consistency, shall first be deposited to cover the bottom forms, and shall be followed immediately by concrete of the regularly specified mixture. Vertical members, such as walls, shall be filled with concrete to a point about 1 inch above the top of the forms, and all concrete above the top of form shall be struck off when the water settlement has taken place.

Where footings and floor slabs are to be placed directly on the ground, the earth shall be dampened just prior to the placing of concrete, but not to the point of soaking.

If necessary to stop placing concrete before the completion of a section of the work, suitable keys shall be formed at the top of the work in place. These keys shall be formed by the insertion and subsequent removal of beveled wood strips which shall be saturated thoroughly prior to insertion.



Before pouring fresh concrete, the surface of the concrete in place shall be cleaned of all laitance, loose and foreign material, and scrubbed with wire brooms. The surface shall then be drenched with water and covered with a thin coating of neat cement grout immediately before the new concrete is deposited.

Concrete shall not be placed when the atmospheric temperature is below 40 degrees F., unless suitable means are used to heat the materials before placing and to protect the concrete after placing so that no damage from frost or freezing will occur. Protection after placing shall include the use of temporary heat and covering if necessary to maintain all portions of the concrete at a temperature of over 40 degrees F. for the full curing periods specified hereinafter.

Lumps of frozen material and ice shall be removed from the aggregates before they are placed in the mixer. Salt or other chemicals shall not be used in the concrete, and manure or other objectionable insulating materials shall not be brought into direct contact with the concrete.

#### Curing and Finishing

2.10 Concrete shall be protected from injurious action by sun, heavy rains, frost, and mechanical injury and shall be kept moist for not less than 7 days after placing. Curing shall be accomplished by leaving the forms in place and keeping them sufficiently damp at all times to prevent drying out of the concrete, or by keeping the surface of the concrete continuously wet with an approved water-saturated covering or by spraying.

The construction of forms and placing of concrete shall be done in a manner that will produce exposed surfaces of uniform color and smooth appearance free from holes, fins, stains, etc.

Especial care shall be used in removing the forms from any concrete surfaces which will be exposed in the finished work. Any voids which appear in the finished work shall be filled with a 1 to 2 cement mortar and any rough edges shall be rubbed with a carborundum brick or other approved abrasive to a smooth, even finish to match the body of the work. Upon completion of the rubbing, the surfaces shall be washed clean with water.

Floors and cover slab of the pumping station shall be floated with wood floats and troweled to a smooth, hard finish. Invert channels and surfaces of manhole bottoms shall be accurately shaped and smooth.





Waterproofing and Dampproofing

2.11 The floor of the pumping station structure shall be waterproofed with an approved integral waterproofing incorporated in the concrete when it is being mixed. The waterproofing material shall be a stable compound which will make the concrete more impervious to water without impairing its durability or reducing the compressive strength. Integral waterproofing shall be used in accordance with the printed directions of the manufacturers.

The walls of the pumping station structure shall be waterproofed with the integral waterproofing as described for the floor, or the exterior surfaces of the walls and the water side of the partition wall shall be dampproofed from the bottom to the finished grade line. If dampproofing is used, a first coat of asphalt primer shall be mopped on, using as much primer as the concrete will absorb. Over this priming coat, two heavy coats of coal tar pitch or asphalt shall be applied hot. Each coat shall be well mopped on until the surfaces are uniformly bright and shiny. No pinholes or voids shall be left in the finished work. The concrete shall be clean and dry before dampproofing is applied.

Materials for dampproofing shall comply with the following Federal Specifications:

Asphalt Primer .....	No. SS-A-701
Asphalt .....	" SS-A-666
Coal Tar Pitch .....	" R-P-381

Measurement and Payment

2.12 The quantities of concrete measured for payment under Item 2 will be the number of cubic yards actually deposited within the lines and grades given in accordance with the drawings, specifications or requirements. All concrete placed outside of these lines and grades to fill unauthorized excavation and all concrete used for replacing defective work, will be at the Contractor's expense.

The price bid per cubic yard for "Concrete" shall include furnishing of all materials and the constructing of the masonry complete as specified.



REINFORCEMENT

Item 3

Extent of Work

3.1 Under Item 3 the Contractor shall furnish and place, in the concrete constructed under Item 2, all steel reinforcement shown or required, and shall do all cutting, bending, fastening and any special work necessary to hold the reinforcement in place. The Contractor shall store the material before it is placed in such manner as to protect against rusting or coating with grease, dirt, or other objectionable material.

Material

3.2 Reinforcing for concrete shall consist of steel bars and shall include all necessary metal spacers, ties, etc. Bars shall be Type B, deformed, Grade 2, intermediate-billet steel, conforming to Federal Specification No. QQ-B-71.

Metal bar supports, spacers, ties, etc., shall be of steel, of an approved design, adequate to insure against displacement of the reinforcement while concrete is being placed.

Shop Drawings

3.3 Shop drawings, bending details, and layouts of all reinforcing shall be submitted to the Bureau for approval.

Measurement and Payment

3.4. The pounds of steel to be paid for under "Reinforcement" will be computed on the basis of 0.2833 pound per cubic inch for the length and cross sections placed in accordance with the drawings or as ordered. The weights of the rods, clips, or other devices used for securing the reinforcing bars shall not be included. No allowance for laps or waste in cutting shall be included except when laps are shown on the drawings or authorized.

The price bid for "Reinforcement" shall include furnishing and placing in the work steel reinforcing bars of the kind and quality and in the manner herein specified.





BRICK MANHOLES

Item 4

Extent of Work

4.1 Under Item 4 the Contractor shall furnish and place all brick for manholes as shown or required, with mortar and appurtenant materials not specifically included under other items.

Materials

4.2 Brick shall conform to Federal Specification No. SS-B-656, Grade M.

Cement shall be an approved standard brand of portland cement complying with Federal Specification No. SS-C-191.

Water for mixing shall be clean, fresh, and free from oil, acid, alkali, salt, and organic matter.

Sand for mortar shall be clean, sharp and free from organic matter. When dry, 100 per cent shall pass a No. 8 sieve, and not less than 60 nor more than 85 percent shall pass a No. 16 sieve, and not more than 20 per cent shall pass a No. 50 sieve.

Hydrated lime shall be an approved brand complying with Federal Specification No. SS-L-351, Type M.

Proportioning of Mortar

4.3 Mortar for brickwork shall be composed of one part portland cement and two parts sand by volume, to which may be added, if the Contractor elects, hydrated lime in an amount not greater than 9 pounds to each cubic foot of cement used.

Materials for each batch of mortar shall be measured carefully, one bag of cement being accepted as equivalent to one cubic foot. Only sufficient mortar shall be mixed at one time to supply the immediate requirements of the work. No mortar shall be retempered or used after it has begun to set.

Laying

4.4 All beds on which brick are to be laid shall be cleaned and wetted properly. No brick shall be laid during freezing weather or when it appears probable that freezing weather will be encountered before the mortar has set, unless adequate cover and heating is provided and only on approval of the Engineer. Manholes shall be accurately dimensioned.



The brick may be laid as headers with the long sides forming radial joints, or in common bond with several courses forming double rows of stretchers to be followed by a course of headers laid with the long sides making radial joints. Bricks shall be thoroughly wetted before being laid, shall be laid with a full bed of mortar and all vertical joints shall be full. The joints on the inside face of the work shall not exceed  $1/4$  inch. Exterior and interior faces of the brickwork shall be smooth. The exterior shall be neatly plastered, at least  $1/2$  inch thick, with mortar as used in laying the brick. Space around the pipes through the walls shall be completely filled with mortar so as to prevent any leakage.

Manhole steps, pipe stubs, and manhole frames and covers shall be set as directed, but will be paid for under appropriate items.

#### Measurement and Payment

4.5 The quantity of brick masonry to be paid for under "Brick Manholes" will be computed by measurement of the number of cubic yards actually built as required by the drawings and directions furnished from time to time by the Engineer. Thickness of brick walls will be taken as 0.70 foot, including the plastering.

The price bid per cubic yard for "Brick Manholes" shall include furnishing of all materials and the constructing of the masonry complete as specified.





## VITRIFIED TILE PIPE

### Item 5

#### Extent of Work

5.1 Under Item 5, the Contractor shall furnish and lay all vitrified tile pipe and specials, complete with all jointing materials and necessary appurtenances, as shown or directed by the Engineer.

#### Vitrified Tile Pipe

5.2 All pipe and specials shall be first quality salt glazed vitrified clay, conforming to the Standard Specifications of the American Society for Testing Materials dated 1924, with all amendments thereto. All pipe shall be hub and spigot pipe of the deep and wide socket type in three foot lengths except 4 or 5 inch pipe which may be in two foot lengths.

#### Inspection

5.3 All pipe and specials used in the work will be subject to inspection when received on the work or when being laid. The following will be considered cause for rejection: Roughness on interior surface that would offer resistance to flow, or tend to catch floating substances; cracks, broken or unbroken blisters, or irregularities on inner surface; piece broken from socket; any palpable defect which would render the pipe unfit for the service intended.

All pipe and specials not passing inspection shall at once be destroyed or removed from the work. In case any pipe or special not accepted by the Engineer is not removed from the work within twenty-four hours by the Contractor, the Engineer shall have the right to dispose of same by breaking or in any other manner desired, at the Contractor's expense.

#### Laying

5.4 Trench excavation shall be as described under the excavation item. Pipe shall be laid accurately to line and grade as given by the Engineer. Each pipe shall be laid so as to form a close joint with the next adjoining pipe and so as to bring the inverts continuously to the required grade. Supporting of pipe on blocks will not be permitted, except where it is to be encased in concrete.

Branches, fittings and specials shall be provided and laid as and where directed. Open ends of pipe and of branches shall be sealed with stoppers or bulkheads firmly held in place in an acceptable manner.



At the end of each day's work the open ends of the pipe shall be satisfactorily protected against the entrance of earth or other material.

Connections shall be made to existing sewers when and as directed.

Pipes passing under roadways shall be encased in concrete when so directed by the Engineer, in such manner as he shall direct, payment being made as provided under the "Concrete" item.

In no case shall water be allowed to rise in or about the pipe before the joint has become thoroughly set. No walking or working over the pipe after they are laid, except as may be necessary in tamping the earth and refilling, will be permitted until they are covered with earth to a depth of twelve inches.

#### Joints

5.5 Joints shall be made with a hot asphaltic compound.

After the pipe has been laid and joined to the next preceeding pipe, a closely twisted hemp or oakum gasket of such diameter as required to fill the bell and make a concentric joint, and of length to pass completely around the pipe and lap at the top, shall be solidly caulked into the annular space with a suitable calking iron. A suitable runner shall then be placed and the asphaltic compound shall be poured in such a manner that the annular space in the joint will be completely filled.

Asphaltic compound shall consist of bituminous material mixed with mineral matter. It shall melt and flow freely at 250° Fahr., and shall show no loss in weight when brought to a temperature of 400° Fahr. It shall adhere firmly to glazed surfaces of pipe, sufficiently to withstand 10 pounds internal pressure under conditions obtained in practice. When set it shall have sufficient elasticity to permit of slight lateral flexure without injury to the joint or breaking the adhesion to the pipe.

The amount of bituminous material extracted by carbon bisulfide shall not be less than 40 per cent and the weight of mineral matter determined as ash shall not exceed 50 per cent.

It shall show no deterioration of any kind when immersed for a period of 5 days in a 1 per cent solution of hydrochloric acid or a 5 per cent solution of caustic potash.





Measurement and Payment

5.6 The quantity of pipe and specials paid for will be the number of linear feet measured along the axis of the pipe including specials, but not manholes, after pipe and specials are laid, as actually placed in the work in accordance with the drawings or directions of the Engineer, plus an allowance of two feet of pipe for each elbow, Y-branch, tee or other special. Specials shall have allowance on the basis of the larger diameter.

Separate price shall be bid for 8-inch, 6-inch, 5-inch, and 4-inch, under the item subdivisions of 5a, 5b, 5c, and 5d, respectively. The price bid per foot for "Vitrified Tile Pipe" shall include furnishing and laying of the pipe and specials and all expenses and materials incidental thereto and not specifically included under other items.



## CAST IRON PIPE AND SPECIAL CASTINGS

Item 6Extent of Work

6.1 Under Item 6, the Contractor shall furnish and place all cast iron pipe and special castings, with bolts, gaskets, lead, etc., as shown or directed by the Engineer. Chief items will be the specials in the pumping station and the discharge line from it. Additional cast iron pipe will be required for road or creek crossings.

Specials to Conform to Equipment

6.2 The arrangement of the piping in the pumping station shall be made to conform to the pumps and valves included under Item 9. The Contractor shall submit suitable dimensioned drawings for that piping either under this item or the drawings shall be included with those for Item 9. Drawings of special castings shall be submitted for approval before the Contractor purchases such castings, unless the castings are standard specials.

Quality

6.3 All cast iron pipe and special castings shall meet the requirements of the current Standard Specifications for Cast Iron Pipe and Special Castings of the American Water Works Association, which, except if herein modified, are hereby made a part of these specifications. Centrifugally cast pipe conforming to Federal Specification WW-P-421, Class 150, will be acceptable if offered by the Contractor at the unit price bid per ton for C. I. pipe.

Class of Pipe

6.4 The 6-inch discharge line shall be Class B. Special castings shall be the next heavier class listed in the American Water Works Association Specifications. Road or creek crossing cast iron pipe if required to be incorporated in the tile pipe lines shall be of Class B, or heavier if required by the Engineer.

Flanged Pipe and Specials

6.5 All flanged pipes and special castings shall meet the requirements of the American Water Works Association for special castings so far as they apply. All holes for bolts or studs shall be drilled and spot faced on the back. Flanges shall be cast solid and faced accurately at right angles to the axis of the pipe, and shall be coated with white lead immediately after facing and drilling. The dimensions and drilling of flanges shall be in accordance with the American Standard.





### Inspection

6.6 No certificate of inspection by testing laboratory will be required. Inspection will be made by the Engineer after delivery of the pipe and specials, and any pipe or specials failing to pass that inspection, within the requirements of the American Water Works Association Specifications, will be rejected.

### Laying

6.7 Suitable tools for the safe and convenient handling and laying of all pipe and special castings shall be used. Great care shall be taken to prevent the pipe coating from being damaged, particularly on the inside. All pieces shall be carefully examined for defects and no piece known to be defective shall be laid. The pipes and castings shall be thoroughly cleaned before laying and shall be kept clean until accepted in the completed work. They shall be laid accurately to lines and grades shown, and where lines and grades are not detailed on the contract drawings the pipes shall be laid as direct as possible with smooth bends where bends are required and upon the best practicable grades. Cutting of pipes to fit in the lines shall be done so as to leave a smooth end at right angles to the axis of the pipe. Where a sleeve is used to join two spigot ends, the pipe shall be made to full length so as to secure a butt joint within the sleeve and leave no gap between the spigot ends. As indicated on the drawings, special two-bell wall castings shall be provided through concrete walls where unequal settlement might occur, where flanged fittings might otherwise be difficult to align or place, or where replacements might be necessary.

### Supporting Pipe

6.8 All pipe and specials placed in excavation shall be laid on a good foundation. Each length of pipe and each special casting shall be laid upon blocking of sound lumber set in at least two places along its length. The blocking shall be bedded firmly. Special fill shall be made if required as described under the excavation item. Where shown on the drawings or required by the Engineer, concrete piers or other foundations shall be provided at creek crossings or elsewhere and will be paid for under Item 2.

Pipes and specials in the pump chamber shall be adequately supported in a neat and workmanlike manner.

### Lead Joints

6.9 The spigot end of each piece shall be set within 1/8 inch of the full depth of the bell that it enters and adjusted so as to provide a uniform joint space. The joint shall be made with the best quality of hemp packing or jute and soft pig lead. The packing shall be loosely twisted in one piece for each joint and shall be thoroughly driven into the bell so that the lead, after having been calked, shall



have a depth of 2-1/2 inches. Each lead joint shall be made at one pouring. The furnace and melting pot shall be kept near the joint to be poured, and dross shall not be permitted to accumulate in the melting pot. The joints shall be thoroughly calked and in such a manner as will insure tight joints without overstraining the iron of the bells.

#### Flanged Joints

6.10 All flanged joints shall be made with a full face gasket of best quality cloth insertion rubber, one-sixteenth inch thick, and shall be drawn together until perfectly watertight. Bolts and nuts shall be of the best quality refined iron or mild steel with sound, well fitting threads. The nuts shall be cold punched, trimmed, and chamfered. All bolt heads, threads, and nuts shall be of United States Standard.

#### Testing

6.11 All cast iron pipe lines, except free drains, shall be tested for tightness by the Contractor and under the direction of the Engineer. The contractor shall furnish at his own expense all the necessary materials, appliances and labor for testing the lines. When pipe lines are laid in excavation or bedded in concrete, testing in general shall be done prior to refilling or placing of concrete covering. All joints shall be examined during the test and all leaks shall be calked or otherwise stopped to the satisfaction of the Engineer.

All pipe lines carrying water, sewage, or sludge shall be tested by filling with water under a hydrostatic pressure at least equal to the rated working pressure for which the pipes are designed.

If, and as necessary, the Contractor shall furnish, install and, when through, remove temporary flanges, plugs, or bulkheads to permit of the required pressure tests.

#### Coating and Painting

6.12 All cast iron pipe and specials shall be coated at the foundry with coal-tar pitch in accordance with the requirements of the Standard Specifications of the American Water Works Association, Section 13. Underground pipe work shall not be painted in the field except for restoring abraded coating.

Pipe and specials in the pump chamber shall be painted with three field coats of aluminum paint. Aluminum paint shall consist of 2 pounds of aluminum powder to 1 gallon of highest quality vehicle.

#### Measurement and Payment

6.13 The total weight of cast iron pipe and specials to be paid for shall be the weight furnished and laid except that the total weight to be paid for shall not exceed the sum of standard weights of the same number of pieces of the given size and class by more than two





per cent. Weights shall be based on the net weights as laid, after facing and drilling flanged pipe and fittings and after cutting off waste ends of pipe. Lead, jute, bolts, nuts and gaskets required for the proper making of joints shall be included in the price bid per ton for the pipe and specials, and their weight shall not be included in the weight paid for.

The price bid per ton of 2,000 pounds for "Cast Iron Pipe and Special Castings" shall include the furnishing, handling, and laying of all cast iron pipe and specials with all appurtenant material and labor necessary to complete the work as specified and not specifically included under other items.



## CAST IRON FRAMES AND COVERS

### Item 7

#### Extent of Work

7.1 Under Item 7, the Contractor shall furnish and place all cast iron manhole frames and covers as indicated on the drawings or required.

#### Materials

7.2 Iron castings shall be first quality gray iron in accordance with Federal Specification No. QQ-I-651.

#### Details and Workmanship

7.3 Castings shall be boldly filleted at angles and the arrises shall be sharp and perfect, and shall be true to pattern in form and dimensions, free from pouring faults, sponginess, cracks, blow holes and other defects. Castings having blow holes plugged or filled with putty or cement of any kind will not be acceptable.

The covers shall be without perforations, shall bear on their seats without rocking, and shall be provided with flush rings or other approved means for lifting. They shall be marked "Sewer".

The combined weight of each cover and frame to be placed on the brick manholes shall be approximately 330 pounds. Frames and weights about 10 per cent more or less will be acceptable if of approved design. Covers for this service shall have an approximate diameter of 24 inches, and frames shall have bottom flanges suitable for seating on the brick manholes.

Frames and covers on the pump chamber shall be of the size and type indicated on the drawing.

All surfaces of the covers and frames shall receive a heavy coat of coal-tar and rosin or coal-tar pitch varnish. Castings shall be thoroughly clean and free from all rust, grease, loam or other foreign substance when the coating is applied, and shall be coated before rusting has begun. Any damaged coating shall be repainted after the castings are set.

#### Payment

7.4 Cast iron frames and covers will be paid for at the price bid per frame with cover for the actual number furnished and set as specified or directed.



MANHOLE STEPS

Item 8

Extent of Work

8.1 Under Item 8, the Contractor shall furnish and set all manhole steps as indicated on the drawings or required by the Engineer.

Materials and Workmanship

8.2 Manhole steps shall be 3/4 inch round wrought iron or steel rods, "U" in shape, approximately 12 inches wide galvanized after bending. The open ends of the irons shall be hooked.

If the Contractor elects, he may furnish and place cast iron steps of approved dimensions instead of galvanized iron rods. Cast iron shall conform to Federal Specifications No. QQ-I-651. Such steps shall be suitably painted.

The steps shall be anchored securely into the masonry, and shall extend a sufficient distance away from the wall to provide proper footing. They shall be located as indicated on the drawings or as ordered by the Engineer.

Measurement and Payment

8.3 All manhole steps will be paid for on the basis of the actual number furnished at the unit price bid.





## PUMPING STATION SUPERSTRUCTURE

### Item 9

#### General Requirements

9.1 Under Item 9, the contractor shall provide all labor and materials for constructing the superstructure of the Pump House, including all of the structure above the first floor line and the steel stairs from the first floor to the pump pit.

#### Brickwork

9.2 All bricks shall be solid and hard-burned, of dark red color, and shall meet all requirements of Federal Specification SS-B-656, Grade H.

Mortar shall be composed of one part portland cement, one part hydrated lime, and six parts sand, all by volume. Portland cement shall be in accordance with Federal Specification SS-C-191. Hydrated lime shall comply with Federal Specification SS-L-351, Type M. Sand shall be clean, sharp, and well graded. Water shall be clean and fresh. Materials for each batch of mortar shall be measured carefully, one bag of cement being accepted as equivalent to one cubic foot. Only sufficient mortar shall be mixed at one time to supply the immediate requirements of the work. No mortar shall be retempered after it has begun to set.

All beds on which brick are to be laid shall be cleaned and wetted properly and all bricks shall be wetted thoroughly before being laid. Brickwork shall be built plumb and true to line and shall be bonded thoroughly. Brick shall be laid in common or running bond with a through header course every sixth course. Joints shall be approximately 1/2 inch thick and shall be cut flush. All metal anchors, frames, etc., shown or required in connection with the brickwork shall be built in as the work progresses.

#### Steel Stairs

9.3 Stairs from first floor to pump pit shall be constructed as shown, using 10-inch, 8.0 pound channel strings to which shall be riveted or welded 1-1/4" by 1-1/4" by 3/16" carriage angles for the support of steel bar treads. Strings shall be secured to pit floor and at first floor in an approved manner. Treads shall be of the manufacturer's standard design capable of supporting a load of 100 pounds per square foot and shall be bolted securely to the carriage angles. All surfaces of metal, of steel stairs shall be given one shop coat of the manufacturer's standard primer.



Pipe railings shall be 1-1/2 inch inside diameter standard galvanized wrought iron or mild steel pipe with standard galvanized malleable iron screw fittings. The railings shall be bolted securely to the stair construction in an approved manner.

Shop drawings of the stairs and railings shall be submitted for approval.

### Carpentry

9.4 Lumber and wood materials shall be in accordance with Federal Specification MM-L-751. Grades of the materials shall meet the requirements of the latest grading and classification rules of the recognized associations of lumber manufacturers producing the materials. Framing lumber shall be No. 1 common yellow pine or Douglas fir of equal grade. Exterior and interior finishing woodwork, except wood sash, shall be "C" grade yellow pine or Douglas fir of equal grade. Wood sash shall be "C Select" white pine.

All wood work shall be carefully protected from injury until the completion of the building. Woodwork shall be finished smooth with joints tight and so formed as to conceal shrinkage. Frames shall be set accurately and braced to hold their position and shape. Door, sash, and all movable parts shall be fitted accurately with proper clearance and left in perfect working order. Woodwork shall be left clean and free from warp, open joints, and other defects. Hardware shall be accurately fitted and adjusted.

All necessary rough hardware shall be provided. Nails, spikes, screws, etc., shall be of suitable types and sizes to draw members into place and hold them securely. Anchors, bolts, etc., for wood framing and for roof construction, as indicated or required, shall be furnished and installed.

Roof shall be constructed with plates, rafters, ties, etc., of sizes and spacing as indicated. Sheathing shall be 1 inch thick square edge lumber, not to exceed 8 inches in width, laid horizontal, well driven up, and face nailed with 6-penny nails well set at every bearing.

Grounds, blocking, etc., as shown or required, shall be provided to give proper support and nailing for finish woodwork.

Eave molding shall be provided as shown.

Frames and trim for windows and door shall be constructed as detailed. Sash shall be made with the number and sizes of lights as indicated, of stock design, molded and rabbeted for glass, mortised, tenoned and pinned together. Sash shall have weather lipped meeting rails and shall be plowed for sash cords. Door shall be of batten type made with T & G, V-joint, vertical boards with batten brace strips as indicated.





### Roofing.

9.5 Roof construction shall be entirely finished, all nails shall be well set, and the sheathing shall be swept clean and shall be firm and dry at the time shingles are applied.

Asbestos shingles shall be of approved manufacture, made of portland cement and pure asbestos fiber formed under pressure. The shingles shall be of uniform size approximately 8 by 16 inches and not less than 1/4 inch thick at the butt. They shall have a rough, dark red surface finish.

Asphalt roofing felt weighing approximately 15 pounds per square shall be placed over the sheathing before shingles are applied. The felt shall be laid horizontally with all joints lapped at least 3 inches and cemented together.

Shingles shall be laid "American" method, with a 2-inch lap of the third shingle over the first. They shall be laid close, in regular horizontal courses and to true line. Each course shall break joints with the preceding course. Each shingle shall be nailed with 1-1/4 inch galvanized slating nails. Bottom courses shall be laid double on cant strips of proper thickness. The shingles shall be laid with Boston ridge and hips. Hip shingles shall be mitered with roof courses and made tight. Shingles at ridge, hips, and eaves shall be laid in an approved elastic roofing cement.

### Hardware

9.6 All hardware necessary for the complete finishing of the building shall be furnished and installed. Hardware types, etc., are those of Federal Specifications FF-H-106, FF-H-111, and FF-H-116 for Builders' Hardware and FF-P-101a for Padlocks.

Door shall have 3 hinges Type 2212, 8-inch length; hinge hasp Type 1401, 3-inch length; and padlock Type 7a.

Each window shall have sash pulleys Type 1248; sash weights Type 1701; sash fastener Type 1139A; sash lifts Type 1201A; stop adjusters Type 1343; and sash cord 1/4 inch in diameter (in accordance with Federal Specification T-C-571).

### Glazing

9.7 All glass shall be double strength, B quality, clear window glass in accordance with Federal Specification DD-G-451. Putty shall be in accordance with Federal Specification TT-F-791, grade A.

Glass shall be secured by brads and shall be back puttied and properly set in putty without springing or forcing. Face putty shall be finished smoothly to true, even lines. Rabbets that are to receive putty shall be primed before putting.



## Painting

9.8 All paint and paint materials shall be of approved manufacture and shall be delivered to the job in the manufacturer's original containers. The following materials shall be in accordance with the Federal Specifications noted:

White lead .....	Federal Specification	TT-W-251 (Type B)
Red lead (95 per cent grade) .	" "	TT-R-191
Linseed oil (raw) .....	" "	JJJ-O-336
Linseed oil (boiled) .....	" "	JJJ-O-331
Turpentine .....	" "	LLL-T-791
Drier .....	" "	TT-D-651
Lead-zinc ready mixed paint ..	" "	TT-P- 36 (Type B)
Black paint .....	" "	TT-P- 61 (Type B)
Putty .....	" "	TT-P-791 (Grade B)

Paint shall be applied with brushes and each coat shall be spread evenly using sufficient material to thoroughly saturate and fill the surfaces. All finished surfaces shall be smooth, even, and free from all defects.

All surfaces of windows and door and their frames, etc., and all wood surfaces exposed on the exterior of the building shall be given a priming coat of white lead paint mixed in proportion of 100 pounds white lead paste to 3-1/2 gallons linseed oil to 2-1/2 gallons turpentine to 1 pint drier.

All surfaces of steel stairs that will be in contact after erection, and all surfaces where shop paint is rubbed off or bare metal exposed in any manner shall be given a field priming coat of red lead paint.

All surfaces of finished woodwork that will be in contact with masonry or that will be concealed in the finished work, shall be given in addition to priming, one heavy coat of lead and zinc paint.

All exposed woodwork specified above to be primed shall be given two finish coats of lead and zinc paint, colored as directed.

All exposed metal work, except galvanized metal, shall be given two coats of black paint.

## Payment

9.9 The lump sum bid for "Pumping Station Superstructure" shall include the providing of all labor and materials for the superstructure complete as specified.



## PUMPING EQUIPMENT AND APPURTENANCES

### Item 10

#### Extent of Work

10.1 Under Item 10, the Contractor shall furnish and place the centrifugal pumps, shafting, couplings, motors, floats, float piping, automatic starting and stopping apparatus, interior wiring and conduits, lighting fixtures, supports for the pipe, the valves, and everything necessary to make the pumping station ready for service which is not specifically included under other appropriate items. Transformers will be furnished and set by others, but the Contractor shall connect to the transformers, located about 50 feet from the pumping station, under this contract.

#### Approval of Materials

10.2 All materials used in connection with this project shall be new and fully approved by the National Board of Fire Underwriters Laboratories.

The contractor shall, within 30 days after date of notice to proceed, submit for approval to the Bureau, a complete list, in triplicate, of the following materials that he proposes to use in the work, giving the manufacturer's name and address and, if necessary for proper identification, the trade name and catalog number:

(1) Service Switch (2) Switches (3) Wire (4) Lighting Fixtures (5) Pull Boxes (6) Motors and Starting Equipment (7) Electric Heaters (8) Pumps (9) Lighting and Power Distribution Cabinet.

In the event that the contractor fails to submit the above list of materials complete as called for or submits materials not strictly in accordance with the specification requirements, then the Bureau reserves the right to reject those submitted and to select a full line of material, which selection shall be final and binding upon the contractor and the material selected or approved must be used in the work.

#### Drawings

10.3 The contractor shall furnish manufacturer's specifications and detailed drawings of pumps and float control apparatus, showing dimensions and details, kinds of material and finish. Characteristic curves of the pumps shall be furnished. All dimensioned drawings necessary to install the equipment including piping and valves, etc., and to supplement the drawing furnished by the Government shall be furnished by the contractor, and approval of all details shall be secured before any work is done on the unit.

The contractor shall furnish a working drawing of the electrical wiring system showing in detail the location of all items, and sizes of wire and conduit. Approval of all details shall be secured before proceeding with the electric wiring.





### Manufacturer's Inspection

10.4 After the apparatus is completely installed ready for use, the manufacturer of the pumps shall make an inspection, check and approve the installation before the pumps are placed in service.

### Motors

10.5 The motors shall be of an approved make, squirrel cage induction type, impregnated against moisture, designed for 208 volts, 3 phase, 60 cycles, 40 degree C. rating.

Motors shall have sufficient capacity to start and operate the pumps at the speed for which the pumps are designed and under all conditions of service of the pumps, but shall not be less than 7-1/2 H.P. The voltage shall appear on the name plates of the motors.

Motors shall be vertical, mounted on frames suitable for insuring perfect alignment and to minimize vibration. The bearings shall be of ample size, with suitable continuous, automatic oiling devices. Bearings and oil reservoirs shall be designed so as to be virtually dust tight. The oiling arrangement shall be such as to minimize the possibility of oil getting into the motor.

The insulation resistance between stator conductors and frames of motors must be not less than 1 megohm and the insulation of stators must be capable of withstanding a break-down test of twice the normal voltage plus 1000 volts alternating current for 1 minute. Squirrel cage rotors must have the bars permanently connected to the end rings. All details of construction or performance not definitely specified shall be in accordance with the latest standards of the A.I.E.E. and N.E.M.A.

No shop tests of motors will be required but the heating effect, insulation resistance, and general operating characteristics will be determined at the building at time of final inspection.

### Controls

10.6 Suitable approved starting apparatus with switches controlled by floats, for automatic operation, shall be provided, with overload and undervoltage protection. Floats and connections from them to the switches shall be of approved design and of materials properly resistant to corrosion. It is expected that normal operation will require the use of one pump at intervals, but the controls shall be arranged so that the second pump will start if one pump for any reason fails to keep the sewage from rising in the receiving well. Convenient means shall be provided for changing the controls when desired, to permit using alternate pumps for the heavier duty. Float piping and connections shall be arranged so that sewer gas cannot enter the pump room through them.



### Service

10.7 Wiring for light and power shall be suitable for a 120/208 volt, 3 phase, 4 wire, 60 cycle system. The electrical contractor shall run service wires and conduit from the main switch in the Pump Building overhead to and terminating in approved weatherproof fittings on a pole to be located by others.

Wires outdoor included in this contract shall be installed overhead and shall be of approved construction.

The latest rules of the National Electric Code and the rules of the company supplying the service shall be considered as included in these specifications and all their requirements shall be fully complied with.

### Conduits

10.8 Each conduit system must be installed complete from cabinet to all outlets shown on drawings or herein specified. All conduits shall comply with Federal Specification No. WW-C-571. Exposed conduit shall be run parallel to or at right angles with the walls and ceilings; horizontal runs shall be close to ceiling beams and passing above water, steam or other piping where possible and shall be supported by pipe straps or other approved fastenings. Exposed conduits shall be run without traps and where dips are unavoidable a 1/2 inch hole shall be drilled in the underside of conduit to permit escape of any moisture which might collect in the conduit.

Concealed conduit shall be run in as direct a line and with as long bends as possible. Not more than the equivalent of four quarter bends shall be used in each run. All bends shall be made with standard conduit ells or conduit bent to not less than the same radius.

All joints shall be cut square, carefully reamed and drawn up tight. No running threads will be permitted. Where conduits cannot be joined by standard coupling, a water tight union shall be used. Conduit shall be continuous between outlets, cabinet, and pull boxes. Terminals of all conduits shall be furnished with lock nuts and bushings.

Each conduit system shall be installed complete before any conductors are drawn in.

### Outlet Boxes.

10.9 Each fixture and switch receptacle, shall be provided with an outlet box. Boxes shall be made of pressed steel not less than No. 14 U.S. gage and shall be galvanized or enameled inside and out.





All boxes shall have standard knockouts for conduit; shall have lugs inside of same to secure covers, etc.; and shall be securely fastened in position by means of approved malleable iron strap supports or hangers. All outlet boxes shall be suitable for the type of construction where used and shall be not less than 4 inches square, round, or octagonal and at least 1-1/2 inches deep with covers where necessary. Boxes shall be screw jointed where exposed.

Boxes for ceiling or bracket fixtures shall have 3/8 inch malleable iron fixture studs securely bolted to bottom of box in an approved manner. Concealed boxes shall be set with the front edge of box or cover flush with the finished ceiling or wall.

Wall switch outlets shall be set about 4 feet above the finished floor.

#### Junction and Pull Boxes

10.10 Junction and pull boxes of sizes proportionate to the sizes of conduits or conductors served shall be installed where necessary or convenient for installing the wires. Boxes shall be of the same construction as outlet boxes. Boxes shall be coated inside and out. They shall have closed covers.

#### Light Switch

10.11 Light switches shall be installed at suitable locations for the convenient control of the lights. Their exact location must meet the approval of the engineer in charge. They shall be of an approved type, single pole and rated at not less than 10 amperes at 125 volts.

#### Lamp Receptacles

10.12 Lamp receptacles shall be furnished and installed at all the lamp receptacle outlets specified. Receptacles shall be medium screw, porcelain, keyless type securely attached to cover of outlet box. All receptacles shall have shade holder grooves.

#### Service Switch

10.13 Main switch shall be totally enclosed in a steel cabinet of Code gage and dimensions, with hinged cover and external operating handle. Switch shall be mounted upon a porcelain or a composition insulating base. It shall be a W.E. Code, type "A", 100 ampere, 230 volt, 4 pole, 3 blade, cartridge fused. Handle shall be indicating to show whether the switch is open or closed. Cabinet shall be provided with grounding lugs.



Feeder Distribution, Light and Power Panel

10.14 The panel, under this heading, shall be of the dead front, safety type and shall be of unit sections of approved molded composition suitable for operation on a 120/208 volt, 60 cycle, three phase, four wire, solid neutral system and provided with switches and fuses of specified size and so constructed that the fuses are dead when the switch is in the non-operating position. Means shall be provided for testing the fuses without interrupting the circuit. Each section shall be removable from the front of panel without disturbing adjacent sections and shall be interchangeable within the panel. Units shall be of molded, non-hygroscopic, fire resisting, insulating material and shall be securely fastened to an adjustable steel back plate or steel channel irons extending the length of the panel.

Panel shall be provided with the necessary bus bars and neutral bar complete with all contacts for neutral wires and such contacts shall be numbered so as to be easily read.

Main bus bars shall be provided with LUGS of the size specified or required by the capacity of the bus bars. Units may be of the Toggle, Brush or Pull-Out type as approved by the National Board of Fire Underwriters.

Panel shall be in accordance with the following schedule:  
100 ampere bus with lugs, feeding:

2	-	60	ampere,	3	pole,	fused	branch	switched	circuits
4	-	30	"	,	2	"	,	"	"
2	-	30	"	,	1	"	,	"	"

Above panel to have not less than 4-inch wiring gutter.

Cabinet:

10.15 Cabinet and front for the panel herein specified shall be constructed of not less than No. 12 U.S. standard gauge sheet steel; shall be of standard make and shall bear the manufacturer's name plate or stamp and the Underwriter's Laboratories inspection label. Front is to be made of one piece of sheet steel.

Gutters not less than 4 inches shall be provided on both sides of panel, and the top and bottom gutters shall be large enough to accommodate cables at these locations and to permit handling of cables with the least amount of effort. Sufficient knockouts of various sizes shall be provided in each end of the box.

Doors shall be flush type closing against a rabbet placed all around the inside edge of the trim, with a close fitting joint between door and trim. Doors shall be fitted with substantial flush hinges.



Cabinet shall be fitted with a catch and lock.

Cabinet must have proper means for securing, supporting, and adjusting the panel board and front, and shall have a directory frame on the inside of door.

It must be shop coated inside and out to prevent oxidation.

#### Fuses

10.16 The contractor shall furnish and install a complete set of fuses of the proper type and size and, in addition, shall furnish the Engineer with a complete spare set of fuses. Non-renewable plug type fuses shall comply with Federal Specification No. W-F-831. Cartridge type fuses shall comply with Federal Specification No. W-F-791.

#### Conductors

10.17 All branch lighting and power conductors and feeders shall conform with the latest edition of the N.E.C. Conductors to the 7-1/2 H.P. motors shall not be smaller than #6, and if larger motors are installed the conductors shall be proportionately larger. All wire No. 8 and larger shall be stranded. All underground conductors shall be lead covered cable and all other conductors shall be rubber covered copper in accordance with Federal Specification No. J-C-101. All wires and cables shall have a distinctive marking the entire length of coil. Ground wires shall be finished white or grey. Each coil shall bear the Underwriters' label giving the gage and trade mark.

No splices or joints will be permitted in either feeders or branches, except at outlets or at accessible junction boxes. Joints must be made mechanically and electrically secure and then soldered or made with solderless connectors and taped with rubber and friction tape. All connections of feeders must be made by soldering wires in cup lugs. No conductors shall be drawn into conduit until the conduit is free from moisture. Sufficient slack shall be allowed to permit the connection of fixtures, switches, etc., without additional splices.

#### Ground Connections

10.18 Ground connections shall be provided for the lighting and power circuits and shall be made by connecting one end of a wire to the neutral service conductor at main switch and the other end to the C.I. sewer pipe. Ground wires shall be of the same kind and quality as other conductors, shall be run in steel conduit, and shall be of the size required by the National Electric Code. In no case shall the grounding conductor be smaller than No. 6.





Connections to pipe and service conductors shall be made in the manner required by the National Electric Code, but the connections to service conductors shall not be made until the time of final inspection.

#### Watt-Hour Meter

10.19 Provision shall be made at the main switch for metering the energy used. The contractor shall furnish and install a 3-element, 5 ampere, 115 volt, 3 phase, 60 cycle totalizing watt-hour meter, with necessary current transformers.

#### Motors and Connections

10.20 The contractor shall furnish and make all necessary connections to motors, controllers, switches, etc., as noted in the specifications. Wiring must have an insulation resistance of at least one megohm and must be free from short circuits and grounds.

#### Wiring

10.21 All wires generally shall be run in rigid steel conduits terminating in approved conduit fittings, or in flexible steel conduit. Wires shall be rubber covered and must be of such size that the maximum current carried will not exceed the limits prescribed by the National Electric Code. No wires shall be smaller than No. 12. Wires No. 8 and larger must be stranded.

All materials and workmanship shall be first class in every respect and in accordance with the conduit and wiring section of this specification. Wiring must have an insulation resistance of at least one megohm and must be free from short circuits and grounds.

A final inspection and test of all wiring shall be made in the presence of the Engineer. All fuses must be in place and the circuits continuous from entrance connections to all outlets, receptacles, etc. The wiring system, with receptacles, etc., connected, must test free from short circuits and from grounds, and must have insulation resistance between conductors and between conductors and ground based on maximum load, not less than the requirements of the latest edition of the National Electric Code.

The contractor will be required to furnish all electric current and instruments for testing the wiring system.

#### Electric Air Heater

10.22 The contractor shall supply three, two-thousand watt, 208 volt, electric air heater, installed in the Pump House where directed by the Engineer. They shall be connected to suitable junction boxes. They shall be equipped with 3 heat switches and shall be of substantial, approved construction, similar to Westinghouse Type E.



Lighting Fixtures

10.23 The contractor shall furnish and install complete, lighting fixtures for two outlets in the building and one at the entrance, including the connection of the fixtures to the wiring system and the furnishing and installation of lamps, in accordance with the following specification:

Two ceiling type vapor proof lamps shall be installed in the Pump House, and one vapor proof bracket light shall be installed outside near the entrance to the building. They shall be controlled by suitable switches. The location of the three lights and their control switches shall be subject to the approval of the Engineer in charge.

Type VP. This fixture shall consist of a one-piece cast brass body, watertight and vaporproof ceiling or bracket type fixture as required. Fixture shall have heavy clear glass screw globe with rubber gasket and brass guard. Each fixture shall be provided with a high heat keyless lamp receptacle. Finish shall be dull bronze.

Contractor shall furnish and install three 100 watt lamps complying with Federal Specification No. W-L-101.

Pumps

10.24 The pumps shall be of an approved make of highest quality, of design suitable for the purpose intended and shall be vertical ball-bearing non-clogging sewage pumps with 4-inch flanged suctions and discharges. The pumps, motors, shafting, couplings, floats, float piping, and starting apparatus shall be furnished as units by the pump manufacturer.

The pumps shall each be capable of delivering not less than 200 gallons per minute with a total lift of 54 feet, when operated singly. The total lift given includes 44 feet of static head, and friction. When both pumps are operating simultaneously, the total lift will be increased by the amount of additional friction loss in 1300 feet of six-inch pipe and the two pumps shall deliver not less than 350 gallons per minute against that head. There will be a positive head on the suction under practically all conditions. The pumps shall be designed for high efficiencies at the capacities and lifts given, and shall have as high an efficiency as possible at those points on the characteristic curve, the better efficiency to occur for the lower lift condition.

All openings shall be large enough to permit the passage of a sphere 3 inches in diameter. The pumps shall have readily accessible cleanouts, and their assembly shall be such as to provide easy access to all parts.





The casings shall be of high grade cast iron, free from defects. Shafts shall be of open hearth machinery steel, of liberal diameter. Impellers shall be of the closed type, and the forward ends of the blades shall be well rounded to avoid catching trash. Impeller design shall be such as to give highest possible shut-off head. Bearings shall be ball or roller bearings, well lubricated. All parts shall be readily accessible. Adjustment shall be provided for where necessary or desirable. Stuffing boxes shall be of ample depth, and provided with approved packing. Flexible couplings shall be provided for the intermediate shaft. The intermediate shaft shall be of such design and dimensions as to work without vibration at the necessary speed, and steady bearings shall be provided if necessary.

The workmanship throughout shall be of the highest grade and all parts guaranteed against defects for one year.

#### Tools

10.25 The contractor shall furnish such tools as are necessary or useful for the maintenance, operation and adjustment of the units, and shall mount them on a neat board.

#### Valves

10.26 The contractor shall furnish and place the valves as indicated on the drawing. They shall be 125 pound test.

Lubricated plug valves shall be of a high grade and of an approved make and type. Machinery and finish shall be of first quality. Each valve shall consist of a cast iron body, plug and threaded bottom cover, a large lubricant receptacle, a rolled steel lubricant set screw, ball check and lubricant plug, and shall have vertical lubricant ducts in the body abutting the plug and horizontal lubricant ducts or chambers at top and bottom of plug. Opening through the valve shall be full pipe area, smooth and so shaped as to offer a minimum of resistance to flow. Plugs shall have solid head construction, and square stem for wrench operation. Valves shall have no glands, bonnets, or stuffing boxes and shall require no packing or gaskets. They shall open and close with a quarter turn, and shall have positive stops. Operation shall be smooth, with no leakage and no binding or freezing. Lubricant in the proper form shall be provided in quantity sufficient to fill the valves three times.

Two flat wrenches for operating the plug valves shall be provided.

The 6-inch flap valve on the end of the overflow line shall be iron body bronze mounted of approved design.

The 1-1/2 inch gate valves shall be entirely of bronze, with solid wedge discs, non-rising stems and hand wheels. They shall be of the best quality.



The 4-inch check valves shall be iron-body, bronze mounted swing gate check valves of approved design and best quality.

#### Testing Pumps

10.27 The contractor shall at his own expense, except for electric power, make such reasonable tests in the field as the engineer may designate to show that the capacity, efficiency and smoothness of operation of the equipment are in accordance with the specifications.

#### Painting of Equipment

10.28 Valves shall receive shop coats of asphaltum varnish.

Valves and piping shall be painted with three field coats of aluminum paint, those not previously coated first receiving a suitable priming coat.

Pumps and motors shall be painted as follows, unless otherwise permitted when other standards of manufacturer's are approved. They shall have a priming coat of best quality red lead at the shop. The remaining painting and filling shall be done in the field, unless otherwise permitted. After priming, they shall be coated with machinery filler, rubbed to an even surface with pumice stone, followed by one coat of titanium and zinc paint, and three coats of aluminum paint.

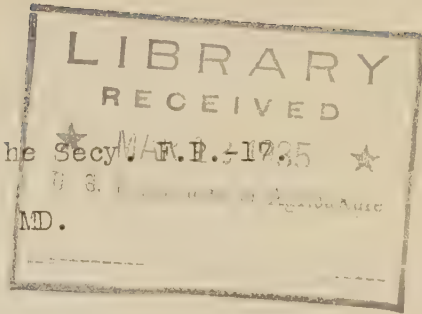
Aluminum paint shall consist of 2 pounds of aluminum powder to 1 gallon of highest quality varnish vehicle.

#### Payment

10.29 The lump sum bid for "Pumping Equipment and Appurtenances" shall include furnishing, installing, connecting, painting and testing of the equipment and appurtenances as specified, with all tools, labor, and materials necessary to complete the work.



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Ag 827-10



Office of the Secy. of the U.S. Army  
MAR 11 1935

ADDITIONAL SEWERAGE SYSTEM - BELTSVILLE, MD.

SCHEDULE OF PRICES

The bidder is informed that the quantities given in the following schedule are approximate only and are subject to either increase or decrease in any amount that will not increase or decrease the total cost by more than 25 per cent, and the bidder hereby proposes to perform all quantities of work, as either increased or decreased, in accordance with the provisions of the specifications, at the unit prices bid.

Item:	Approximate:	Items with Unit Bid	Unit Bid	Total
No.:	Quantities	Price Written in Words	Price (In figures)	Amount of Bid
1	11,000	Cu.Yds. Excavation, for		
			Dollars and	
			cents per cu.yd.	
2	170	Cu.Yds. Concrete, for		
			Dollars and	
			cents per cu.yd.	
3	6,500	Lbs. Reinforcement, for		
			Dollars and	
			cents per pound	
4	120	Cu.Yds. Brickwork, for		
			Dollars and	
			cents per cu.yd.	
5a	12,000	Lin.ft. Vitrified tile pipe, 8-in. diameter, for		
			Dollars and	
			cents per lin.ft.	

(Con't.)





Item:	Approximate:	Items with Unit Bid	Unit Bid	Total
No.:	Quantities	Price Written in Words	Price	Amount
			(In figures)	of Bid
5b	6,300	:Lin.ft. Vitrified tile pipe,6-in:		
		:diameter, for		
		:		
		:_____ Dollars and:		
		:		
		:_____ cents per lin.ft. :		
		:		
5c	300	:Lin.ft. Vitrified tile pipe,5-in:		
		:diameter, for		
		:		
		:_____ Dollars and :		
		:		
		:_____ cents per lin.ft. :		
		:		
5d	1,200	:Lin.ft. Vitrified tile pipe,4-in:		
		:5-inch, or 4-inch diameter, for :		
		:		
		:_____ Dollars and :		
		:		
		:_____ cents per lin.ft.:		
		:		
6	30	:Tons, C.I. pipe and Special		
		: Castings, for		
		:		
		:_____ Dollars and :		
		:		
		:_____ cents per ton		
		:		
7	70	:Cast Iron M.H. Frames and		
		:Covers, for		
		:		
		:_____ Dollars and :		
		:		
		:_____ cents per each:		
		:		
8	220	: Manhole Steps, for		
		:		
		:_____ Dollars and :		
		:		
		:_____ cents per each:		

(Con't.)



Item No.	Approximate Quantities	Items with Unit Bid Price Written in Words	Unit Bid Price (In figures)	Total Amount of Bid
9	:	: Pumping Station Superstructure;	:	:
	:	: for the lump sum of	:	:
	:	:	:	:
	:	: _____ Dollars and:	:	:
	:	:	:	:
	:	: _____ cents. :	:	:
	:	:	:	:
10	:	: Pumping equipment and	:	:
	:	: appurtenances for the lump	:	:
	:	: sum of	:	:
	:	:	:	:
	:	: _____ Dollars and:	:	:
	:	:	:	:
	:	: _____ cents. :	:	:

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TOTAL

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